



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor Applicant:

Yuegang Zhang

Serial No.: 10/761,575

Filed: January 21, 2004

For: End Functionalization of Carbon
Nanotubes

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Art Unit: 2813

Examiner: Thanhha S. Pham

Atty Docket: ITL.1076US
(P18261)

Assignee: Intel Corporation

Mail Stop **Appeal Brief-Patents**
Commissioner for Patents
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APPEAL BRIEF

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Date of Deposit: October 12, 2006

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Nancy Meshkoff

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REAL PARTY IN INTEREST

The real party in interest is the assignee Intel Corporation.

RELATED APPEALS AND INTERFERENCES

None.

STATUS OF CLAIMS

Claims 1-16 (Canceled).

Claims 17-19 (Rejected).

Claim 20 (Canceled).

Claims 21-31 (Rejected).

Claims 17-19 and 21-31 are rejected and are the subject of this Appeal Brief.

STATUS OF AMENDMENTS

All amendments have been entered.

SUMMARY OF CLAIMED SUBJECT MATTER

In the following discussion, the independent claims are read on one of many possible embodiments without limiting the claims:

17. A transistor comprising:
a source region (Figure 28, 30) (specification at page 9, lines 16-19);
a drain region (Figure 28, 28) (specification at page 9, lines 16-19);
a plurality of nanotubes (Figure 28, 32) extending between said source and drain regions, said nanotubes having functionalized ends (Figure 27, A, B) with attached functional groups (specification at page 9, lines 2-7); and
a gate electrode over said nanotubes (Figure 28, 34, specification at page 9, lines 12-14).

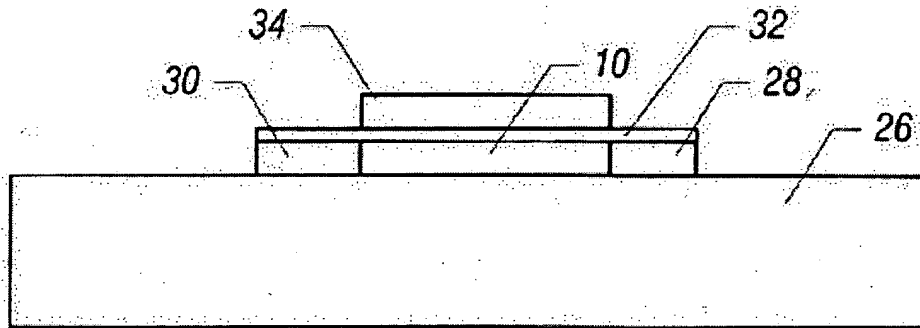


FIG. 28

23. A transistor comprising:
a source region (Figure 28, 30) (specification at page 9, lines 16-19);
a drain region (Figure 28, 28) (specification at page 9, lines 16-19);
a plurality of open ended nanotubes (Figure 28, 32) extending between said source and drain regions (specification at page 9, lines 12-19); and
a gate electrode over said nanotubes (Figure 28, 34, specification at page 9, lines 12-14).

28. A transistor comprising:
a source region (Figure 28, 30) (specification at page 9, lines 16-19);
a drain region (Figure 28, 28) (specification at page 9, lines 16-19);
a plurality of nanotubes (Figure 28, 32) extending between source and drain regions, each nanotubes including two opposed ends (Figure 27, A, B), the opposed ends of each nanotube having different functional groups attached to the opposed ends (specification at page 9, lines 2-7).

At this point, no issue has been raised that would suggest that the words in the claims have any meaning other than their ordinary meanings. Nothing in this section should be taken as an indication that any claim term has a meaning other than its ordinary meaning.

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

- A. Whether claims 17-19, 21, and 28-31 are anticipated under 35 U.S.C. § 102(e) as being anticipated by Nihey (U.S. Patent Publication No. 2004/023887).**
- B. Whether claims 22-27 are unpatentable under 35 U.S.C. § 103(a) over Nihey (U.S. Patent Publication No. 2004/023887) in view of Luyken (U.S. Patent Publication No. 2003/0148562).**
- C. Whether claims 22-27 are unpatentable under 35 U.S.C. § 103(a) over Nihey (U.S. Patent Publication No. 2004/023887) in view of Plefferle (U.S. Patent Publication No. 2003/0148086).**

ARGUMENT

A. Are claims 17-19, 21, and 28-31 anticipated under 35 U.S.C. § 102(e) as being anticipated by Nihey (U.S. Patent Publication No. 2004/023887)?

The rejections should be reversed because the claims have limitations that are being ignored and because the asserted rationale to combine is that, because the missing element is known, it would be obvious to insert it into the claimed combination. Since neither of these positions is supportable, reconsideration is requested.

Claim 17 calls for a plurality of nanotubes extending between source and drain regions, the nanotubes having functionalized ends with attached functional groups. Functional groups are explained in the specification at page 6, lines 8-20 and “functionalized” and “functional groups” are well known terms of art meaning the part of a compound that takes part in reactions. See definition attached.

The cited reference to Nihey is asserted to teach ends being functionalized because they function as an electrical connection. Such an interpretation is impermissible since it merely reads out a well known term of art and would apply the claim to any structure using a carbon nanotube to connect source and drain. To the contrary, the claims calls for nanotubes having functionalized ends with attached functional groups. The reference teaches no functionalized ends or attached functional groups.

Claim 28 calls for different functional groups attached to the opposed ends. In this support of this rejection, it is suggested that the source and drain constitute different functional groups. Of course, this is ridiculous since sources and drains are basically the same material, just differently connected to the transistor. They have no functional groups and they certainly do not have different functional groups.

Therefore, the rejections should be reversed.

B. Are claims 22-27 unpatentable under 35 U.S.C. § 103(a) over Nihey (U.S. Patent Publication No. 2004/023887) in view of Luyken (U.S. Patent Publication No. 2003/0148562)?

Claim 23 calls for open ended nanotubes. The rejection suggests that, while the reference fails to teach this structure because open ended nanotubes are known, it would be obvious to use

them in this solution. But, of course, everything is known and, therefore, under this analysis, everything would be obvious. There is no reasons to use open-ended nanotubes in a transistor. This is a non-statutory approach and should be rejected.

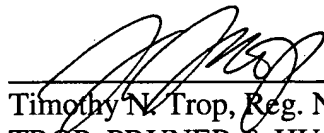
C. Are claims 22-27 unpatentable under 35 U.S.C. § 103(a) over Nihey (U.S. Patent Publication No. 2004/023887) in view of Plefferle (U.S. Patent Publication No. 2003/0148086)?

Claim 23 calls for open ended nanotubes. The rejection suggests that, while the reference fails to teach this structure because open ended nanotubes are known, it would be obvious to use them in this solution. But, of course, everything is known and, therefore, under this analysis, everything would be obvious. There is no reasons to use open-ended nanotubes in a transistor. This is a non-statutory approach and should be rejected.

Applicant respectfully requests that each of the final rejections be reversed and that the claims subject to this Appeal be allowed to issue.

Respectfully submitted,

Date: October 12, 2006



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CLAIMS APPENDIX

The claims on appeal are:

17. A transistor comprising:
 - a source region;
 - a drain region;
 - a plurality of nanotubes extending between said source and drain regions, said nanotubes having functionalized ends with attached functional groups; and
 - a gate electrode over said nanotubes.
18. The transistor of claim 17 wherein said nanotubes are parallel to one another.
19. The transistor of claim 17 wherein said nanotubes are spaced equidistantly from one another.
21. The transistor of claim 17 wherein said nanotubes have opposed first functionalized ends coupled to said source region and second functionalized ends coupled to said drain region, said first functionalized ends attracted to said source region and not said drain region.
22. The transistor of claim 17 wherein said nanotubes are capless.
23. A transistor comprising:
 - a source region;
 - a drain region;
 - a plurality of open ended nanotubes extending between said source and drain regions; and
 - a gate electrode over said nanotubes.
24. The transistor of claim 23 wherein said nanotubes are parallel to one another.

25. The transistor of claim 23 wherein said nanotubes are spaced equidistantly from one another.

26. The transistor of claim 23 wherein said nanotubes have functionalized ends.

27. The transistor of claim 23 wherein said nanotubes have opposed first functionalized ends coupled to said source region and second functionalized ends coupled to said drain region, said first functionalized ends attracted to said source region and not said drain region.

28. A transistor comprising:
a source region;
a drain region;
a plurality of nanotubes extending between source and drain regions, each nanotubes including two opposed ends, the opposed ends of each nanotube having different functional groups attached to the opposed ends.

29. The transistor of claim 28 wherein said nanotubes are parallel.

30. The transistor of claim 28 wherein said nanotubes are spaced equidistantly from one another.

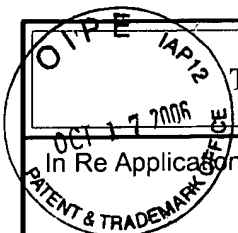
31. The transistor of claim 28 wherein said nanotubes have opposed first functionalized ends coupled to said source region and second functionalized ends coupled to said drain regions, said first functionalized ends attracting to said source region and not said drain region.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.



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TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No.
ITL1076US

In Re Application Of: Yuegang Zhang

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/761,575	January 21, 2004	Thanhha S. Pham	21906	2813	2608

Invention: End Functionalization of Carbon Nanotubes

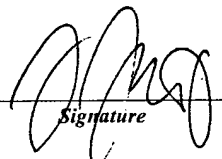
COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on
August 21, 2006

The fee for filing this Appeal Brief is: \$500.00

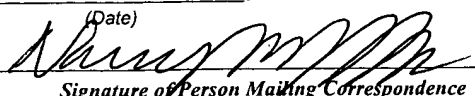
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Dated: October 12, 2006

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